



## **STRUCTURAL EQUATION ANALYSIS OF DENTAL SCHOOL RELATED STRESS FACTORS**

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### **Abstract**

Stress has been an important topic that has been interest of many researchers for decades. It has proven to have several negative effects on well-being as well as having vital effects on health. Also it effects students' academic success in dental schools which are known to be highly stressful environments due to complicated theoretical knowledge and clinical competencies. Dental Stress Questionnaire was used as a measurement tool in our study and was distributed to all dentistry students in the Dental School. Main aim of this study is find relationship between years of study with stress factors and to introduce a Dental Clinic Model. A detailed literature review was delivered where some studies are found to support our research study and some of these were found to have contradicting results. IBM SPSS Statistics 25, IBM SPSS AMOS 26.0 are used for data analysis. The structural equation model of the Dental Stress Model shows a perfect fit ( $CFI > 0.9$ ,  $GFI > 0.9$ ,  $0.05 < RMSEA < 0.08$ ) and Chi-square values ( $\chi^2 < 2$ ) shows that the model is valid.

**Keywords:** Dental students, stress factors, SEM analysis, dental stress model.

### **INTRODUCTION**

Students' stress has been a major topic in education and it has several negative effects on their well-being which may have serious consequences that may lead to depression and anxiety. The effect of a stressor on a person depends on how the person takes the tension. If a person takes the event positively by accepting it as a part of the challenge in life and find ways to cope with it, the stress will decrease and go when he/she gets over it. However, stress may leave the person a prolonged emotional disturbance.

There are many symptoms of stress, like phobia, hostility, fear, tension, sleeplessness, tiredness, dizziness and tachycardia which may lead to physical symptoms like psychological distress, emotional exhaustion, burnout, mood alteration, effect on performance, headaches, sleep disturbance, experiencing flu or development of oral ulcers (Gorter et al., 2008; Ko, Kua, & Fones, 1999, Jain & Bansal, 2012). It is known that not only the stress but the duration of the stressors significantly influence the final endocrine response. Leptin, nitrite, adrenomedullin, neuropeptide, cortisol and adrenocorticotrophic hormone can be accepted part of a complex mosaic model of the psych neurohormonal changes in academic stress, which is a model of psychological stress in humans (Al-Ayadhi, 2005) Academic stress has also effects like failure in courses or getting low mark in courses other effects on students other than all the effects mentioned before.

The dental profession has been recognized as a stressful profession and it is widely associated with high-stress levels. Stress plays an important role in dental students' education. Students in Dental Schools are expected to gain a wide range of knowledge and skills in their work and future career (Atkinson, Millar, Kay, & Blinkhorn, 1991; Gorter et al., 2008; Sugiura, Shinada & Kawaguchi, 2005).

Therefore, dental schools are known to be highly stressful environments due to theoretical knowledge and clinical competencies. Especially clinical environments are regarded as stressful environments and has many important effects (Alzahem, et.al, 2001). Although every student face with different levels of stress, it's a fact that every student come across to stress many times in their life. Several challenges of life can cause physical and psychological distress, which can affect students' well-being and performance (Naidu, Adams, Simeon, & Persad, 2002; Westerman, Grandy, Ocanto, & Erskine, 1993).

Numerous research studies have been delivered at several dental schools worldwide. However, recent research study is significant study in the following sense: It is the first study in Cyprus which examines, stress among dental students by providing a Dental Clinic Model. Main aim of this study is find relationship between years of study with Dental stress factors and to introduce a Dental Clinic Model.

## METHODS

The protocol for the present study was approved by the Human Ethics Committee of Near East University, Turkish Republic of Northern Cyprus (No: YDU/2019/70-845). To collect data, the Dental Environment Stress (DES) Questionnaire is used, which was introduced by Garbee in 1980 was modified (Garbee, Zucker, & Selby, 1980; Humphris et al., 2002). Questionnaire is divided into 4 categories: Demographic information, social stressors, academic stressors, and clinic-related stressors. The response codes for each item were: 1, "not stressful"; 2, "slightly stressful"; 3, "moderately stressful"; 4, "quite stressful"; and 5, "very stressful". Scores for each category were assessed by response codes in those categories. The questionnaire was distributed to all of the undergraduate dental students studying at Cyprus Health and Social Sciences University students. The purpose of the study was explained in advance to the students, and they were told that their participation in the research was voluntary. Questionnaires included questions for preclinical (first, second and third year) and clinical (fourth year) dental students. IBM SPSS Statistics 25 and IBM SPSS AMOS 26.0 were used for data analysis. Descriptive statistics frequencies and percentages were used to analyse and to report the data gained from the questionnaire.

## RESULTS

Demographic Information, Percentages of the Stress Factors according to Years, Clinical Relationships and Dental Clinic Model are reported in this section.

### Demographic Information

Among 170 dental students, 23 females and 22 males were the 1<sup>st</sup> year students; 25 females and 10 males were the 2<sup>nd</sup> year students; 37 females and 25 males were the 3<sup>rd</sup> year students; and 21 females and 7 males were the 4<sup>th</sup> year students. This sample is 89% of the all dentistry student population in the university. This distribution is shown in Table 1.

Table 1: Demographic Information

Year of Study	Female (n)	Male (n)	Total (n)
<b>1st year</b>	23	22	45
<b>2nd year</b>	25	10	35
<b>3rd year</b>	37	25	<b>62</b>
<b>4th year</b>	21	7	28
<b>Total</b>	106	64	170

### Stress Factors and Years

The questionnaire items were analysed and the most interesting percentages are reported in "Self-Efficacy Believes", "Workload and Exams", "Academic Stress and Financial Stress" groups. The stress factors "Lack of confidence in self to become a successful student", "Fear of failing course or year",

"Lack of confidence in self to become a successful dentist" and "Completing graduation requirements" which are related with Self-Efficacy Believes.

Table 2: Percentages of the Stress Factors according to Years

	<b>Dental Stress Factors</b>	<b>Year1 (%)</b>	<b>Year2 (%)</b>	<b>Year3 (%)</b>	<b>Year4 (%)</b>
<b>Self-Efficacy Believes</b>	1. Lack of confidence in self to become a successful student	84	74	84	57
	2. Fear of failing course or year	84	74	84	57
	3. Lack of confidence in self to become a successful dentist	47	63	60	57
	4. Completing graduation requirements	58	69	79	43
<b>Workload and Exams</b>	5. Amount of assigned classwork	62	71	79	68
	6. Lack of time between laboratories or clinics	67	71	84	79
	7. Attendance and success in medical subjects	84	74	84	57
	8. Difficulty of classwork	71	89	94	71
	9. Lack of time to do assigned schoolwork	58	69	79	43
<b>Academic Stress</b>	10. Exams	91	89	97	18
<b>Financial Stress</b>	11. Expensive Equipment	76	89	89	93

84% of the 1<sup>st</sup> year and the 3<sup>rd</sup> year students have "Lack of confidence in self to become a successful student" stress and "Fear of failing course or year" stress; 84% of the 3<sup>rd</sup> year students have "Lack of time between laboratories or clinics" stress and "Attendance and success in medical subjects" stress; 94% of the 3<sup>rd</sup> year students have stress about "Difficulty of classwork"; 97% of the 3<sup>rd</sup> year students have "Exams" stress; and 93% of the 4<sup>th</sup> year students have stress about "Expensive Equipment" (Table 2).

The stress factors from "Amount of assigned classwork", "Lack of time between", "laboratories or clinic", "Attendance and success in medical subjects", "Difficulty of classwork" and "Lack of time to do assigned schoolwork" are reported in Workload and Exams.

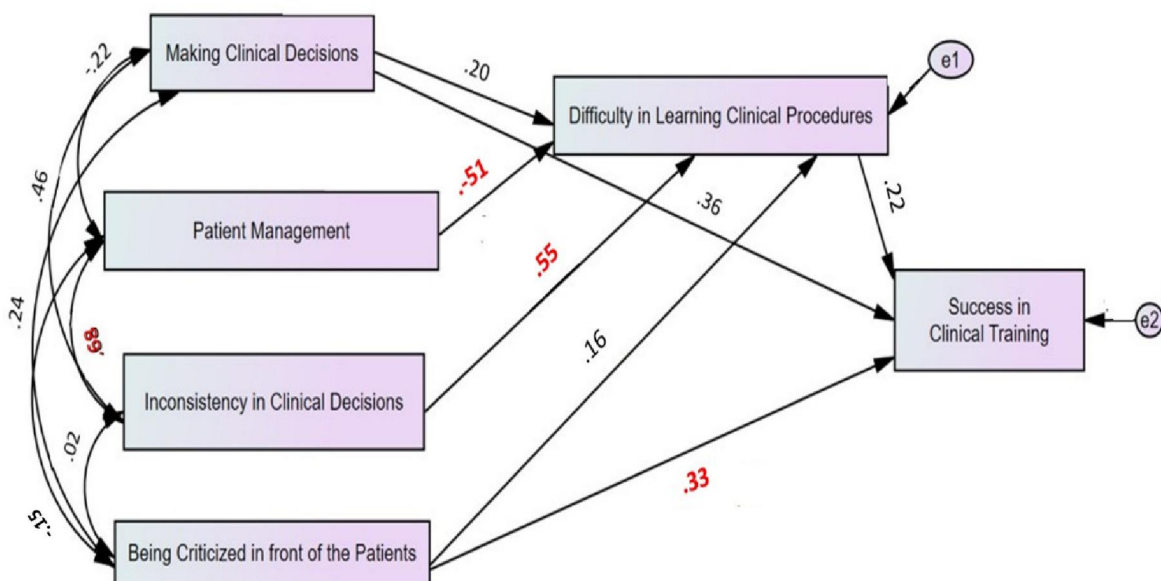
Proposed model in Figure1 is drawn in IBM SPSS AMOS 26 Graphics and the correlations among variables are calculated, the relations which are not significant were deleted. There is a negative relationship between **Difficulty in Learning Clinical Procedures** and **Patient Management** ( $p=0.001$ ), a positive relationship between **Difficulty in Learning Clinical Procedures** and **Inconsistency in Clinical Decisions** ( $p=0.002$ ). Also, there is a positive relationship between **Difficulty in Learning Clinical Procedures** and **Being Criticized in front of the Patients** ( $p=0.019$ ). There is a positive relationship between **Success in Clinical Training** and **Difficulty in Learning Clinical Procedures** ( $p < 0.01$ ). There is a positive relationship between **Success in Clinical Training** and **Being criticized in front of the patients** ( $p < 0.01$ ). This was an interesting finding and can be interpreted as the more that students are criticized the more that they were studying and are more successful in clinical studies (See Table 3).

Table 3: Clinical Relationship Table

					Estimate	S.E.	C.R.	P
Difficulty in Learning Clinical Procedures	<---	Making Clinical Decisions	Clinical		0,253	0,17	1,492	0,136
Difficulty in Learning Clinical Procedures	<---	Patient Management			-0,047	0,015	-3,195	0,001
Difficulty in Learning Clinical Procedures	<---	Inconsistency in Clinical Decisions			0,014	0,004	3,096	0,002
Difficulty in Learning Clinical Procedures	<---	Being criticized in front of patients			0,551	0,235	2,348	0,019
Success in Clinical Training	<---	Difficulty in Learning Clinical Procedures			0,157	0,056	2,799	0,005
Success in Clinical Training	<---	Making Clinical Decisions			0,329	0,07	4,696	***
Success in Clinical Training	<---	Being criticized in front of patients			0,848	0,162	5,22	***

The resulting model is shown in *Figure 1*. The insignificant parameters were removed from the proposed model and a valid model was obtained where the variables which are related to each other are shown and the variables in the questionnaire and their correlation coefficients are shown. The structural equation model of the valid model shows a perfect fit and Chi-square values of the valid model ( $\chi^2=5.2$ ;  $df=2$ ,  $p=0.076$ ) and fit indices (NFI=0.989; CFI=0.993) show that the model is valid. The structural equation model of the Dental Stress Model showed a perfect fit (CFI>0.9, GFI>0.9,  $0.05<RMSEA<0.08$ ) and Chi-square values ( $\chi^2/df<3$ ) showed that the model is valid.

Figure 1: Dental Clinical Model



Especially the clinical practices are stressful experiences and students are often insecure about communicating with patients and managing the patient for the first time in clinical training. They can

easily learn clinical procedures and may experience a lack of knowledge about patient management. Improving students in learning clinical procedures improves the quality of patient management that can be delivered by dental students' clinical training. *Inconsistency in Clinical Decisions, Criticism in Front of Patients, and Success in Clinical Education* are found to be most important stress factors about the clinical education. These concerns make it difficult to learn Clinical Procedures and this affects success in clinical training. The results of this study support the existing evidence in the literature, indicating that pre-clinical students reported that examinations and fear of failure caused the most stress, whilst for clinical students, the main stressor was the clinical training.

Acharya (2003) and Naidu et al.(2002) have delivered a research study and reported Year of Study has been previously reported as a modifier of stress-provoking factors, students in different years of study perceived different sources of stress also in this research, it is seen that the 3<sup>rd</sup> year students have "Exam" stress, and 93% of the 4<sup>th</sup> year students have stress about "Expensive Equipment" (Table 2). Examinations and grading were the most common stress factors among the students. The mean scores for the DES items showed that, in all dental students the most cited academic stressor was "Examination and grades" (Ahmad, Md Yusoff, & Abdul Razak, 2011; Muirhead & Locker, 2007).

Researchers previously mentioned high stress because of "lack of time for relaxation" (Rajab, 2001; Sanders & Lushington, 2002; Westerman et al., 1993) and in our study 3<sup>rd</sup> year students seemed to be exhausted as 84% of them have stress about "lack of time between laboratories or clinics". These findings indicate that third-year students may be overloaded by the high academic demands of their year of study. Sanders and Lushington (2002) found that the clinical years are more stressful than the pre-clinical years and instructors themselves often create more stress than the treatment of patients. Muirhead & Locker (2007) found that receiving criticism about work was also a significant clinic-related stressor in the literature. Findings of current research study support the existing literature identifying stress sources among dental students and are in general agreement with similar studies carried out in the world (Al-Omari, 2005; Elani et al., 2014).

## CONCLUSION AND RECOMMENDATION

The research study which was delivered with 170 dental students in a Health University, and these were 89% of the population (n=192). The highest stress factor of dental students was found to be "Academic" stress (97%), the second is "Financial" stress (93%) and the third is "Workload" (94%). Dental clinic model shows positive and negative relationships between clinical stress factors. Dental students have a negative relationship between "Difficulty in Learning Clinical Procedure" and "Patient Management" ( $p<0.01$ ) and there is a positive relationship between "Success in Clinical Training" and "Being criticized in front of patients" ( $p<0.01$ ). This study is limited with the students in the study and only one university in Cyprus. Researchers' further studies will contain students from different universities. It is important for dental schools to identify stress levels among students when planning the curriculum and to provide a less stressful atmosphere for their working environment. Therefore, they should organize delivering Dental Stress Questionnaires to find students stress factors and try to provide solutions to these. They should put adoptable rules for the dental faculties. Stress reduction techniques that include reading magazines or books, listening to music, playing a musical instrument, shopping, window shopping, watching movies at home or at the cinema, sleeping, talking with friends, family, lecturers, academic advisors or seek professional help: doctor, psychiatrist, a counsellor can be suggested to the students to alleviate these stresses

**Note:** This study was presented as an oral presentation at 11<sup>th</sup> International Congress on New Trends in Education, April 18, 2020, Turkey.

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